

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

ALLOWABLE SUBJECT MATTER

The Examiner's allowance of claim 11 is respectfully acknowledged. Claim 11 has been amended only to make some minor clarifying amendments, and it is respectfully submitted that the amendments to claim 11 are not related to patentability and that claim 11 remains in condition for allowance.

THE CLAIMS

Independent claim 1 has been amended to recite steps of monitoring hydraulic pressure in a bottom side of at least one cylinder of a cylinder arrangement relative to a predetermined pressure value, determining that an excavating operation starts when the measured duration time equals a predetermined duration time and thereafter, the hydraulic pressure in the bottom side exceeds the predetermined pressure value, and determining a displacement of the hydraulic pump smaller than a maximum displacement of the hydraulic pump only after it is determined that the excavating operation has started such that the displacement determination is based on the measurement of the duration time relative to the predetermined duration time and the

monitoring of the hydraulic pressure relative to the predetermined pressure value.

In addition, independent claim 6 has been similarly amended to recite that the controller measures a duration time of a state in which the hydraulic pressure in a bottom side of at least one cylinder of the cylinder arrangement is at a predetermined pressure value or less, determines that an excavating operation starts when the measured duration time equals a predetermined duration time while the detection value is at the predetermined pressure value or less and thereafter, the detection value exceeds the predetermined pressure value, and thereafter outputs a displacement control signal for reducing the displacement of the variable displacement hydraulic pump to a predetermined displacement that is smaller than a maximum displacement of the variable displacement hydraulic pump to the displacement control device such that output of the displacement control signal is based on the measurement of the duration time relative to the predetermined duration time and the monitoring of the hydraulic pressure relative to the predetermined pressure value.

Still further, claims 2-5, 8 and 9 have been amended to better accord with amended independent claims 1 and 6.

No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered.

THE PRIOR ART REJECTION

Claims 1 and 6 were rejected under 35 USC 103 as being obvious in view of the combination of JP 09060047 ("Yasuda") and US 2003/01544091 ("Adachi et al"), and claims 2-10 were all rejected under 35 USC 103 as being obvious in view of various combinations of Yasuda and Adachi et al with one or more of EP 0462589 ("Izumi"), DE 3823283 ("Takeuchi"), and USP 6,312,209 ("Duell et al"). These rejections, however, are respectfully traversed with respect to the claims as amended hereinabove.

According to the present invention as recited in amended independent claim 1, a method for controlling a hydraulic pump for a working machine of a working vehicle having a cylinder arrangement for operating the working machine includes monitoring hydraulic pressure in a bottom side of at least one cylinder of the cylinder arrangement relative to a predetermined pressure value, measuring a duration time of a state in which the hydraulic pressure in the bottom side of the at least one cylinder is at the predetermined pressure value or less, and determining that an excavating operation starts when the measured duration time equals a predetermined duration time and thereafter, the hydraulic pressure in the bottom side exceeds the predetermined pressure value. Amended independent claim 1 further recites determining a displacement of the hydraulic pump smaller than a maximum displacement of the hydraulic pump only after it

is determined that the excavating operation has started such that the displacement determination is based on the measurement of the duration time relative to the predetermined duration time and the monitoring of the hydraulic pressure relative to the predetermined pressure value, and performing control to reduce the displacement of the hydraulic pump to the determined displacement.

Similarly, according to the present invention as recited in amended independent claim 6, an apparatus for controlling a hydraulic pump for a working machine of a working vehicle having a cylinder arrangement for operating a working machine includes a bottom pressure detector for detecting a hydraulic pressure in a bottom side of at least one cylinder of the cylinder arrangement, a displacement control device for controlling a displacement of the variable displacement hydraulic pump, and a controller. As recited in amended independent claim 6, the controller inputs a detection value from the bottom pressure detector therein, measures a duration time of a state in which the hydraulic pressure in the bottom side of the at least one cylinder is at a predetermined pressure value or less, determines that an excavating operation starts when the measured duration time equals a predetermined duration time while the detection value is at the predetermined pressure value or less and thereafter, the detection value exceeds the predetermined pressure value, and

thereafter outputs a displacement control signal for reducing the displacement of the variable displacement hydraulic pump to a predetermined displacement that is smaller than a maximum displacement of the variable displacement hydraulic pump to the displacement control device. As such, output of the displacement control signal is based on the measurement of the duration time relative to the predetermined duration time and the monitoring of the hydraulic pressure relative to the predetermined pressure value.

With the method and structure of the present invention as recited in amended independent claims 1 and 6, it becomes possible to detect that the working machine is performing an excavating operation, and thereby reduce the pump displacement to a corresponding desired displacement in order to effectively reduce the loss of power which might arise when changing operation of the working machine and thereby provide for a more effective operation (see the specification at page 13, line 23 to page 14, line 14). In addition, the reduced pump displacement ensures that a required oil flow rate is provided irrespective of the load of the cylinder.

It is respectfully submitted that the cited prior art references do not at all disclose, teach or suggest the above described structural features and advantageous effects of the present invention as recited in amended claims 1 and 6.

In particular, it is respectfully pointed out that Yasuda and Adachi et al do not disclose determining a displacement of a hydraulic pump relative to the determination that an excavating operation has started, as according to the present invention as recited in amended independent claim 1. In addition, it is respectfully pointed out that Yasuda and Adachi et al do not disclose a controller that outputs a displacement control signal for reducing the displacement of a hydraulic pump based on monitoring of hydraulic pressure relative to a predetermined pressure value which is used to determine that an excavating operating has started, as according to the present invention as recited in amended independent claim 6.

Izumi, Takeuchi and Duell et al, moreover, have only been cited with respect to the subject matter of dependent claims 2-5 and 7-10.

Accordingly, it is respectfully submitted that amended independent claims 1 and 6, and claims 2-5 and 7-10 depending therefrom, all clearly patentably distinguish over the cited references, taken singly or in any combination consistent with the respective fair teachings thereof, under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

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Response to Office Action

Customer No. 01933

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,

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